A REDESIGN OF THE STUDENT RECORD SYSTEM FOR THE DEFENSE LANGUAGE INSTITUTE, WEST COAST

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THESIS

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Record System for the Defense
Language Institute, West Coast

by

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ABSTRACT

This thesis presents the development and planning for redesigning the Student Record System at the Defense Language Institute, West Coast. The redesign is based on the INFONET system of Computer Sciences Corporation and the use of a data base system and data base language: Data Management Language (DML). This system is in the process of implementation at the Computer Systems Division of the Defense Language Institute, West Coast at the present time.

TABLE OF CONTENTS

LIST OF FIGURES

TABLE OF ABBREVIATIONS

1. CSC - Computer Sciences Corporation
2. CSD - Computer Systems Division
3. CSTS - Computer Sciences Timesharing System
4. DLI - Defense Language Institute
5. DLIMAST - DLI Masterfile (Student Record System)
6. DLIWC - Defense Language Institute West Coast
7. DML - Data Management Language
8. GPS - General Programming Subsystem
9. GSA - Government Services Administration
10. NELC - Naval Electronic Laboratory Center
11. RCC - Remote Communication Concentrator
12. SDA - Systems Development Agency
13. SSN - Social Security Number
14. SSRS - Standardized Student Record System

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I. PROBLEM STATEMENT AND OBJECTIVES

The problem was to re-design the data processing system at the Defense Language Institute West Coast for use on the INFONET system of the Computer Sciences Corporation in order to make the system more responsive to user needs. This led to the design and implementation of a data base system, for manipulation by non-computer personnel at DLIWC, which would interface with the existing data processing system. Three major areas of the Computer Systems Division of DLIWC were investigated. These areas are: course scheduling and management, resource management and student records. These systems had long turn around times and low through put rates.

The computer was not used for resource management. Resource management which was done manually had little accuracy and was not controlled.

Another major problem was in the student registration system at the school. The form the student filled out on arrival did not capture all the information that was required of him. This information was then hand punched on IBM cards and transferred to the main computer facility at the Naval Electronics Laboratory Center at San Diego and finally received by the user departments at DLI nearly a week later. This situation had an adverse effect on teachers during the first week of school because changes in student status and classes were being made.

All grading was maintained manually as was the attendance of each student. This information was sent to the Computer Systems Division every six weeks to be entered in the files.

These conditions contributed to the untimeliness of many required reports, such as the registration reports and class rosters.

Other problems arose from the fact that the present system was built piecemeal, each subsystem standing alone with no interface with the other subsystems.

The hardware configuration also caused major problems. All master files were maintained on magnetic tape. Not more than ten percent of the records on file were updated at any one time, but since they were on tape, the entire file had to be passed for update.

A committee was established to investigate these problems and analyze and design a better system. This committee decided that a generalized data base system to manipulate data concerning courses, student records and resources was needed. The committee wanted an interactive query capability with inputs from non-computer personnel at the department level at DLI.

The project was initiated by making a determination of all outputs necessary to capture and store the data required to solve the problem. Subsequent efforts were made to determine which processes and systems were in existence and relavent to the problem at that time, and if mechanization of these processes was feasible. Finally, a data base system would be developed which would interface with other ongoing DLI systems, thereby expanding the existing data base and creating new areas of related information.

Many alternative systems were considered and will be examined in the next section. The INFONET system, which is a subset of the Computer

Science Time Sharing (CSTS) system, was selected due to the existence of a G.S.A. contract for INFONET services, which DLI and the committee was not aware of at the time. Due to this factor, the scope of the problem did not change but the selection of the system and hardware had been decided. This allowed DLI to concentrate on the problem of converting to the new system without becoming involved in the detailed analysis of choosing hardware and software and negotiating contracts with various vendors.

II. APPROACH

The initial approach to designing an Automated Data Processing system or redesigning an existing system consists of conducting meetings with top management in order to determine some basic goals. What should be automated in the organization? This was the most significant question. The DLI had a computer, but the design called for the implementation of new processing procedures. Investigation of all repetitive tasks was performed. In addition, chronic problem areas were investigated, such as the interface of the various subsystems at DLI. Along with the repetitive tasks were the many clerical functions that could easily be computerized. Lastly, it was found that response time was too long and that operating costs were too high.

Next came the feasibility study of the project. A proposed schedule was set up with two months for overview and detailed study of the project and related systems; four months for system design, data base structuring, form and report design and production; four months for program development and testing; and two months for the system implementation. This led to a target completion date of middle of fiscal year 1974.

The feasibility study investigated the present system (discussed in section III), the conceptual design of the INFONET system (discussed in section IV), and a quasi-economic comparison of the two systems. The two systems could not be accurately and objectively compared, since they were both under G.S.A. contracts and it became imperative (under orders from the Department of the Army) to implement the INFONET system.

It was determined that the centralized computer centers of Computer Sciences Corporation and the de-centralized data processing facilities of DLI were extremely advantageous for the Army, since records and data could be accessed from all parts of the country.

The next major problem was to find a file system which would provide an interface with other files and which would provide retrieval of information from a data base quickly and easily. Four major types of files were investigated: sequential or serial files, partitioned files, indexed sequential files, and direct or random files.

In sequential files, records are organized strictly on the basis of relative position, usually around a logical key. Individual records cannot be located quickly by this method, and adding and deleting records usually requires a complete rewrite of the file. Searches in a sequential file are extremely time consuming and most records are accessed each time the file is processed.

The parti tioned file consists of several sequential members. It contains a fixed amount of space, which is fixed at file creation, but elements within this space may be reused. The members of this file are located by a directory which is organized by member name. These members can be added or deleted.

The indexed sequential file combines direct access and sequential processing. It allows both rapid sequential access and rapid location of a particular record (when using disk or drum). Records are added to a file in a special overflow are, either on the end of a track or on a separate track in a disk.

In the direct or random file the relative position of one record to another is of little importance. However, there must be a predicatable relationship between the logical key for a record and its physical location on a disk. This is done by either having the logical key for a record be thephysical address for that record or by using an address calculation algorithm in connection with a directory at the beginning of a track on a disk with pointers to the records on that track.

It was determined that although the indexed sequential file structure seemed to be the best one examined, it still lacked much of the capabilities that were required. This spurred research into a data base system approach. A data base is a totality of information with logical connections and a common set of definitions. A data base system seemed to be an acceptable approach, since it provides a management information capability , uses storage efficiently, eliminates redundancy in files and records, provides better control of the data, is flexible and adaptable, allows less experienced programmers to use it, and is accessible by online terminals.

Several drawbacks were found concerning data base systems. One of the major drawbacks is the lack of trained personnel in this area. In spite of the drawbacks, it was decided to implement a data base system using DML (Data Management Language) available through the INFONET system.

III. EXISTING SYSTEM

The Computer Systems Division (CSD) of DLIWC had been operating in a timesharing mode by using a computer located at the Navy Electronics Laboratory Center (NELC), San Diego, California. NELC utilizes an IBM 360/65 computer with 512 K bytes of high speed storage and 1024 K bytes of low speed storage. Two selector channels control the 2314 disk packs and the seven magnetic tape drives. Two high speed printers were also available, but since DLIWC had an IBM 2780 card reader and high speed printer, the printers at NELC were seldom used. The operating system employed was the MVT version of OS/360, which provides a multiprogramming capability of up to fifteen jobs.

The Standardized Student Record System (SSRS) was the basis for the existing system. The master file of 2600 records of 300 characters each contained academic and personal information for the entire student body at DLIWC. The system also served as a basis for input to the DLI History File from which certain post-graduation studies were made.

The SSRS consisted of four tapes with a son-father-grandfather backup file system. Student record data for this file was initiated by the completion of the DLI registration form 90. This form was processed by optical scanning equipment, converted into standard card format and served as input, through the IBM 2780, to the computer for adding records to the master file. Corrections, changes, deletions and additions were processed against the record by using the change input forms (DLI forms 35,36, 11).

This master file was used while the student was enrolled, for activation reports and graduation rosters. Upon the graduation of a student, academic data was placed in the record and the record was transferred to the Student History File by the update program, which had procedures that allowed for file protection.

The system included eight basic subsystems: Active Student Records, Student History, Class Scheduling, Schedule Maintenance, Test Development, Test Scoring, Statistical Analysis, and Catalogues. These systems were developed in a helter-skelter manner due to the urgent need for DLIWC to become operational on the NELC system in early 1971. Over one hundred sixty two programs and files had to be maintained in order to operate the existing system. This allowed for little or no interface with other portions of the system.

The Standardized Student Record System had ten major programs consisting of the student input roster, recapitulation of student input, grade sheets, student activation bulletins, Army Intelligence Service input roster, the twelve to twenty-four week projected graduation roster, Army Security Agency input roster, academics records class roster, division information roster and company "B" labels.

There existed three major programs for the graduation reports. There was the Graduation Bulletin for the academic departments, the Graduation labels for the envelopes containing orders and papers for the graduating class and the Graduation Verification Roster to send to the Department of the Army and Service Liaison office.

Sixteen programs and files were needed to generate the output reports required for the different agencies connected with DLIWC. Three separate files were used to output the required data: a master file by name, a master file by social security number and a master file by student class number. From these three files twelve general output reports were produced: the Civilian Student Roster, Dispensary Roster, Resident Student Enlisted Roster, Dental Clinic Roster, Army Security Agency Student Roster, Resident Student Officer Roster, Navy Officer and Enlisted Roster, Army Intelligence Service Roster, Resident Service Count, Recapitulation of Current Status, Educational Status Report and Six Month Projected Graduation Roster.

It is obvious that with all these varied files and report programs many file maintenance routines were needed. Ten such routines were required in order to keep the system operational: the DLI Master file (DLIMAST) update, DLIMAST Tape Log, DLIMAST Edit Listing, DLI Master History Tape Creation, DLI Master History Tape Printout, DLI Master File first 78 characters cut in cards, DLI History File to new tape with printout, DLI Master File to new tape with printout, History Duplication Elminator and Old History File update.

There existed many problems with the system that was established. Reports were not timely; grading by daily, weekly and six week intervals was maintained strictly by hand; and student attendance records were recorded and updated by the professors before being entered on the history file.

The Standardized Student Record System had several basic problems which will be corrected in the proposed system discussed in a later section of this paper. The DLI form 90 (Student Registration) was not designed to capture all of the information required in each record of the Master File. Most of the records were hand punched and initial output reports were usually a week late. Grades, which were entered on a Grade File, were recorded by hand and inputted to the file in a make-shift manner.

Appendix A shows the format of the forms and records that were part of the existing system. Comparison of these forms with those of the new system in a later section, show the improvement that has been made.

IV. INTRODUCTION TO THE INFONET SYSTEM

INFONET is a remote computing network operated by the Computer Sciences Timesharing System (CSTS) operating system. It is designed to be used by users of all levels of proficiency in both batch or interactive mode and gives the user complete flexibility in his use of files. The GSA contract provides DLIWC access to the INFONET communications in 12 Federal Data Processing Centers and the main Computer Sciences Center in Los Angeles.

The CSTS (Computer Sciences Timesharing System) is designed to allow the user to develop and debug all programs interactively whether they are designed for batch use or interactive use, and batch processing can be initiated by a conversational terminal and the output can be directed to any selected terminal or printer. This is done by GPS (General Programing Subsystem) and a unified Command language which can be altered by the user if needed.

The INFONET file system is device-independent, allowing programs to be unaware of where its files are residing, letting them be transferred freely from one device to another without file format change. Direct access storage files are not preallocated because the space is dynamically allocated as files are built and updated and individual files of up to one-quarter billion characters can be maintained.

A. INFONET HARDWARE

The main INFONET computer installation in Los Angeles consists of a UNIVAC 1108 computer and direct access mass storage is provided by a

multiple disk drive subsystem built by Control Data Corporation and interfaced to the CPU by custom built dual controllers (see figures 1 and 2). Removable disk packs allow modual expansion of storage capacity and protection from disk drive failures.

INFONETs Communication network centers around Remote Communication Cencentrators (RCC) which provides data multiplexing and error control while relieving the central computer of most of the communications workload and interfacing. The use of RCC's allow new terminals, speeds, and disciplines to be added without changing hardware or operating system software configurations.

The hardware configuration for DLIWC consists of hardware located in the Computer Systems Division and two remote terminals located at the offices of the Assistant Dean for Administration and the Systems Development Agency. This arrangement allows the other users to create files which are subsequently stored by the personnel of the Computer Systems Division. This file protection procedure restricts the handling of stored files to CSD personnel. The remote users work only on a copy of the files in a work area of the computer.

The hardware at the central Computer Systems Division will consist of three terminals including one Optical Scanning terminal and an IBM 2780 high speed printer and an on-line card reader. This configuration will allow the generation of hard copy reports required for DLI Headquarters Command.

Figure 1

INFONET CONFIGURATION

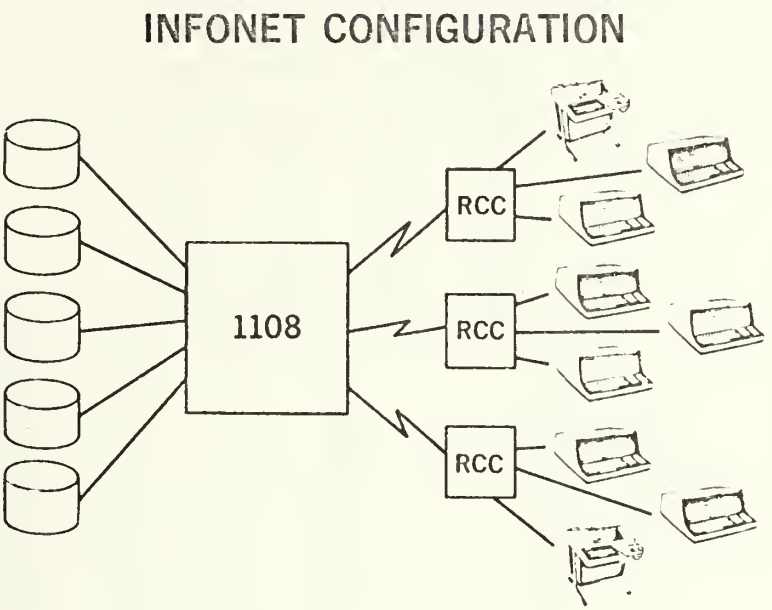
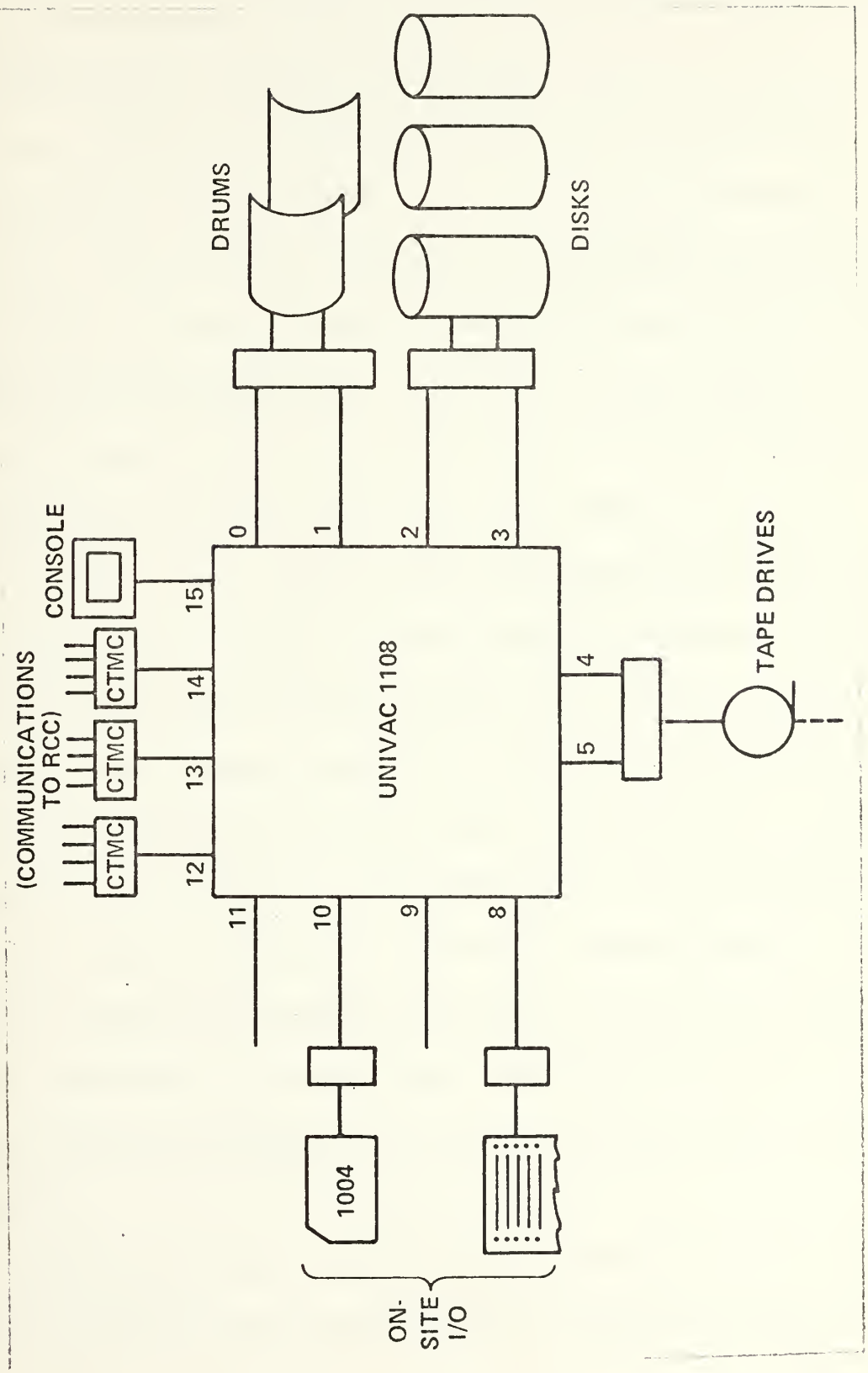


Figure 2

INFONET HARDWARE



V. DATA MANAGEMENT LANGUAGE

The Data Management Language (DML) is an INFONET software system designed to be a powerful tool in creating, updating and managing data bases. DML was designed for the quick implementation of data base applications. By using DML a user can define the structure of a data base, create a data base, retrieve data using either unique record keys or Boolean selection criteria, update a data base, generate reports, perform direct computation using a data base, and create application programs and procedures so that inexperienced users can query data bases.

Using the capability to create application programs, DML enables a user to store frequently used and complex data base manipulation and retrieval statements. DML can be used in either the interactive terminal mode or through batch processing and data bases can be accessed simultaneously by any number of terminals for inquiry or reporting functions.

The DML system operates in the on-line environment of the Computer Science Timesharing System. The system can be used for the production of simple reports or for interactive inquiry for specific information. Previously prepared DML application procedures can be used for the production of data bases and complex reports. This feature allows the user to have a minimal understanding of the operating system in order to achieve his goals.

DML data bases reside on mass storage devices and consist of variable length records that can be accessed either by key or sequentially. Each

record has one key field and up to 250 data fields. Multiple data bases can be accessed concurrently through DML and external data files can be accessed for data base creation and maintenance.

DML is a COBOL like language which interfaces with the COBOL used at DLI. Like COBOL, DML consists of operators and operands. The operators are data base file-handling commands, input/output and formatting commands, computational and manipulative operations, and statistical operators. Operands consist of names of data files or data bases, application procedure statement labels, constants, file elements, subelements, and internal and system variables.

Two important files are data base files and data files. Data base files are logically related records with file element values. Each data base file must have a unique key element or element that enables direct access to any record in the data base. Three data base files may be open at any one time and each data base file can have up to 250 element definitions. The data files are used to interface with the data base files in input and output operations. Data files are used to input data in the batch mode (card input) or disk files created by DML or COBOL. In the same manner, data files can be output to terminals and high-speed printers.

The operators of DML are of seven basic types:

1. general operating commands
2. data base file-handling commands
3. computational and logical operators
4. statistical operators
5. control operators
6. input/output and format commands
7. utility routines

The specific operators for each of the seven types are shown in figure 3.

A. GENERAL OPERATING COMMANDS

The general operating commands are used to interface DML with the General Programming Subysystem (GPS). The DML command requests the use of DML and the RUN command invokes previously prepared and stored DML application programs allowing inexperienced users to execute complex procedures without extensive knowledge of the language.

B. DATA BASE FILE HANDLING COMMANDS

DML data base file-handling commands allow the establishment (creation), access or modification of a data base; partitioning a large data base, and closing a data base from a DML session. DECLARE and CREATE commands are used in establishing a data base file. In accessing a data base file, the commands used are: SEARCH, MORE, FIND, KFIND, WHERE and KWHERE. STORE, CHANGE, REPLACE and DELETE are the commands used in the modification of a data base and the END command is used to terminate a session.

C. COMPUTATIONAL AND LOGICAL OPERATORS

The computational, relational and logical operators employ symbols which are standard for most languages with the exception of the denotations # (logical OR).

D. STATISTICAL OPERATORS

Statistical operators are generally used in conjunction with FIND commands to perform specified computations and store results in user specified internal variables.

E. CONTROL OPERATORS

The control operators: assignment operator (=), GO TO, GOSUB, RETURN, IF and STOP control the entering and exiting of subroutines, jumps in a program, logical if, and the cease of execution of a DML program.

F. INPUT/OUTPUT FORMAT COMMANDS

The INPUT/OUTPUT commands can be either formatted or non-formatted data. The DATA command must be used when information is inputted into or outputted from a specific file. COLUMNS, PAGE, SKIP and LINES commands allow the user to format OUTPUT or PRINT commands in order to facilitiate easy report generation. The UNPACK command allows entry into the elements of a record which also facilitates report generation.

G. UTILITY ROUTINES

DML has two built in utility routines used to enhance report generation. The first, DMLSRT, which resides on GPS (General Programming Subsystem) creates a new data base and sorts the data base in either ascending or descending order. This new data base is independent of the old one and can be used for all sequential reports, inquiries, and updates.

The second utility program, DMLDBD, on GPS, allows the user to list the declaration of an existing data base file. This routine facilitates formatting of application routines for report generation.

In order to interface DML with complex application procedures and to prepare the data files used in the creation of DML data bases, the use of the GPS Editor is a necessity. The Editor is used to create, modify and list punctuated files. The Editor is invoked by requesting GPS and then using the EDIT command. The EDIT command has eleven directives and operators which manipulate files:

1. COPY
2. DISPLAY
3. GAIN
4. KEYS
5. Line
6. LIST
7. NUMBER
8. POST
9. QUIT
10. REVISE
11. STET

COPY is used to insert or replace a line or group of lines, in the edit file. DISPLAY causes specified lines to be displayed after the last edited line in the file. GAIN causes the increment in line numbers to be changed. The KEYS directive displays the first and last line number in the file being edited. The Line number starts automatic line numbering while in the edit mode. It is also used to enter a file being edited at a specific line number. LIST permits the user to list specified lines or range of lines to the output file. NUMBER renumbers all or a specified group of lines in the file being edited. The POST directive applies the updates to the file being edited

and stores the updated file. The QUIT directive terminates the GPS Editor and retains the edited file. REVISE scans the specified lines for a specified search string and applies certain editing operators to each line fournd. Finally, the STET directive discards all updates made since the last POST directive.

The following figures show a sample of DML's use. The first one shows the creation of a data base on an INFONET terminal. This data base was taken directly from the existing SSRS. The three queries that follow as for: first, allof the Colonels at DLIWC (figure 5), second, all of the females at DLIWC between the ages of twenty-four and twenty-seven (figure 5), and third, all of the females at DLIWC under the age of twenty (figure 6).

Figure 3

DML OPERATORS

1. GENERAL OPERATING COMMANDS

   DML
   RUN
   !

2. DATA BASE FILE-HANDLING COMMANDS

   DECLARE
   CREATE
   STORE
   SEARCH
   CHANGE
   REPLACE
   FIND, KFIND, WHERE, KWHERE
   DELETE
   MORE
   END

3. COMPUTATIONAL and LOGICAL OPERATORS

   +, -, *, /, **
   <, =, >
   & (logical AND)
   # (logical OR)

4. STATISTICAL OPERATORS

   COUNT
   SUM
   MAX
   SUMQ
   MIN

5. CONTROL OPERATORS

   =
   IF
   GOSUB
   GO TO
   ELSE
   RETURN
   STOP

Figure 3

DML OPERATORS

6. I/O and FORMAT COMMANDS

DATA
DELIMIT
FORMAT
INPUT
OUTPUT, PRING
COLUMNS
UNPACK
PAGE
SKIP
LI NES

7. UTILITY ROUTINES

DMLDBD
DMLSRT

Figure 4

EXAMPLE DATA BASE PROGRAM

```
!EDIT DDALS2
fL
   10     DECLARE DBASEX, SOCSECNO(C), CLASSNO(C), TAXED (C,1,2),\
   20     LANGCODE(C,3,2), CNSLENGTH(C,5,2), SCHOOL(C,7,1), PAYGRD(C,\

,\
   30     PYGRCLASS(C,3,2),\
   31     DATES(C),ADDTE(C,1,5),GRADDTE(C,6,5),\
   35     FIELDS (C), NAME(C,1,24),RANK(C,25,2),PAYGRD(C,25,1),LANGCHG(\

CE(C,29,1),\
   40       YRSSVC(C,30,2),MARITALSTAT(C,32,1),UNIT(C,33,1),SERVICE(C,34,\

1),\
   45     ASSE(C,35,1),DUTYSTAT(C,36,1),SEX(C,37,1),EDUCATION(C,38,1),\

   50     AGE(C,39,2),DLAT(C,41,2),GTS(C,43,3),ANNIVLANCH(C,46,3)
   70     CREATE DBASEX
   80     DATA CCC
   90     FORMAT F1, 1,9 10,11 21,5 26,5 31,24 55,3.5,1 59,1 60,2 \
  100     62,1 63,1 64,1 65,1 66,1 67,1 68,1 69,2 71,2 73,3 76,3
  110     INPUT CCC,F1, SOCSECNO,CLASSNO,ADDTE,GRADDTE,NAME,RANK,\
  120     PAYGRD,LANGCHG,RACE,ASSVC,MARITALSTAT,UNIT,SERVICE,\
  130     ASSE,DUTYSTAT,SEX,EDUCATION,AGE,DLAT,GTS,ANNIVLANCH
  140     IF SOCSECNO = 'END ',GOTO 170
  150     STORE DBASEX
  160     GOTO 110
  170     END DBASEX
  180     PRINT  'DBASEX CREATED'
  190     STOP
```

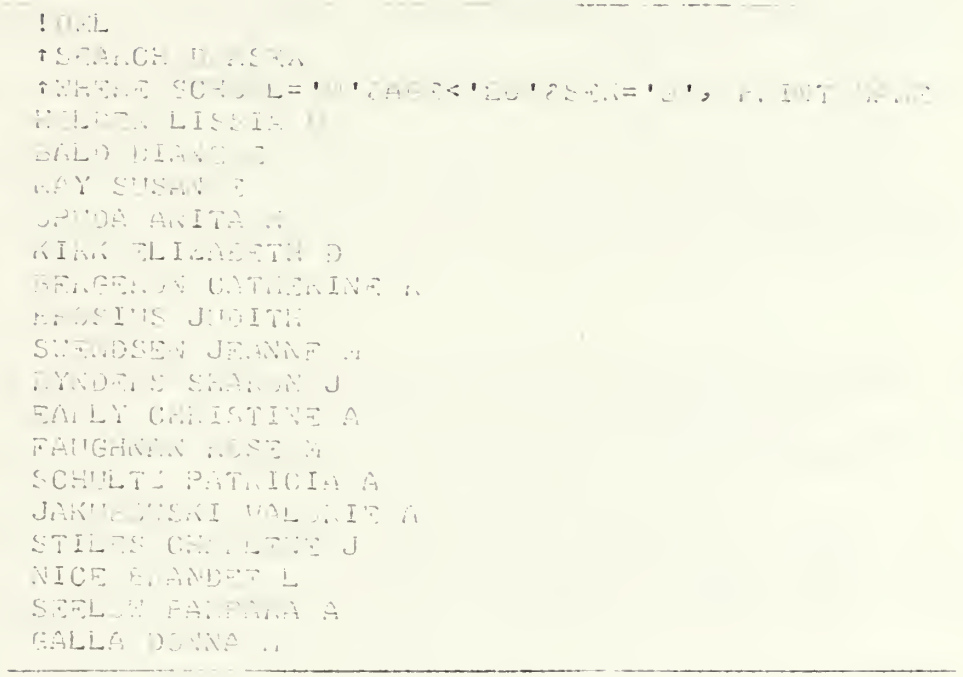
Figure 5

DATA BASE QUERIES

```
FEMALE SCHOOL-EQ 'U' &RANK='COL', PRINT NAME
ROBINIG ROBERT H
RILEY FRANK C
GRIFFITH CLARENCE W
COLLETT RICHARD C
JOHNSON NORMAN J
MCTOALF DONALD J
HAPP JOHN D
HILL MATT G JR
OBRIEMAN JOHN F
FEMALE SCHOOL='U' &AGE>'24' &AGE<'27' &SEX='2', PRINT NAME,RANK
HELLWIG KAY S                    DEP
SEWELL NANCY L                   DEP
GRASZ LORETTA J                  DEP
HOLLENBECK CONSTANCE L           DEP
QUICK GEORGIA L                  PVT
DELEA SANDRA L                   AE
EDGAR DONNA E                    DEP
[illegible] MARY E               DEP
KAEMLING CATHERINE               PVT
NICODEM COLISS T                 DEP
SANASACK BONNIE B                DEP
ANDERSON JANET S                 AE
OBECHLER KAREN L                 DEP
```

Figure 6

Date Base Queries



VI. IMPLEMENTATION

The new Student Record System contains four major files: the Student Masterfile, the History File, and two transaction temporary files used in updating and entering new students.

The Student Masterfile consists of approximately 3000 records, each record containing 250 characters. This Masterfile is an indexed sequential file keyed on the Social Security Number of the student. The file is updated sequentially and specified records can be accessed directly. It is written using standard COBOL in order to comply with the Department of the Army requirements.

A copy of the Masterfile will be put on DML daily for user access. This arrangement not only prevents file alteration by inexperienced users, but also reduces the permanent disk storage space required to maintain twin files. The application programs written in DML will allow inexperienced users (such as Personnel Headquarters Company) to add, change and delete information concerning a student, without the user having extensive knowledge of COBOL or the system operation. Computer System Division personnel can effect the changes to the Masterfile at the end of the day by copying the new masterfile back into COBOL format. INFONET's GPS Editor will be used for this purpose.

Appendix B shows the flow charts and record layouts for the proposed systems.

A. IMPLEMENTATION SCHEDULE

Implementation of the new system is basically an eleven step operation. The first and most important step is the conversion of the existing system at NELC, San Diego, to the INFONET system at Los Angeles, This consists of making the tapes at NELC compatible with Computer Science Corporation's hardware (the INFONET system).

The second step requires parallel operation between the old and new systems. There is a need to run both systems (NELC and INFONET) in parallel for approximately two weeks. This is a safety check to ensure that no information has been lost in the transfer of tapes from NELC to INFONET.

The third step is to discontinue the NELC system and to use INFONET exclusively, producing all present output at the local user high speed INFONET terminal.

Step four is the redesign of input procedures for remote input and update by inexperienced users.

Step five involves user training on those remote INFONET terminals which are not located at the Computer Systems Division.

Step six is the redesign of the Form 90 (student input form) and the grade, attendance and file updating forms. These will all be on an optical scan form; the scanned data will be transmitted to the computer.

Step seven is the redesign of the student records, historical records, and the masterfile and historical file.

Step eight is the writing and testing of the update, file handling, reporting and input programs and the checking of the information flow for the entire system.

Step nine is the final test of the new system. This should be completed approximately by mid-fiscal year 1974.

Step ten is user training for the non-computer personnel at DLIWC. This training will be conducted on a continuing basis due to the turnover in personnel.

The final step is to monitor and modify the system as new requirements arise.

At the present time step eight is almost completed and the planning for step nine is being formulated.

VII. CONCULSIONS

The new system is the first one implemented at DLI with sufficient lead time for study and implementation on a set schedule. The target completion date of mid-fiscal year 1974 will probably be met.

The most important advantage of the new system is the elimination of redundant information. This lowers cost due to the efficient use of storage. There is much shorter response time for transactions due to the on-line operation of the INFONET system. New information can be added to the Student Records as needed. The GPS Editor and DML provide for ease of processing and report generation. Much of the work now done by CSD personnel can be done by non-computer personnel at the Headquarters departments and the Systems Development Agency. The query feature (seen in figures 5 and 6) represents a new capability for DLI. It eliminates many one-time report programs that were needed for statistical studies, thus freeing the system programmers for other duties.

The new system is not without problems and drawbacks. The data base system is conceptually advanced and therefore there exists a lack of well-trained personnel in this area. It is impossible to emulate the existing system with any new system due to the difference in file structures. This may cause problems when a back up system is required during the conversion period. The training of CSD and DLI personnel will be both time-consuming and difficult because there is no training syllabus and the use of the system is being learned through actual operation.

Despite the problems and drawbacks of the new system, it will be a great improvement over the existing system and it will allow the Department of the Army to have a standardized system in all of the Defense Language Institutes.

Future work is planned in connecting all installations of the Defense Language Institute through the INFONET system, thus allowing direct communications and queries among all units and giving better control to the Commander of DLI.

APPENDIX A

Existing System Flow Charts, Record Layouts and Forms

1. Existing System Flow Chart

Figure 7 shows the flow chart of the existing system with the son - father-grandfather back up file system. After card images are cut from the optical scanner, every form including the rough forms are filed and kept by the respective departments. As can be seen, there are five tapes kept in order to produce the reports needed for DLIWC.

2. Student Master Record Layout

Figure 8 shows the record layout of the existing system. It contains 150 characters which captured the data required with 14 characters left for expansion.

3. Student Registration, Input and Change Forms

Figures 9 through 13 show the existing registration forms needed to add the information not included on the student registration forms. Forms 11, 12, and 13 were hand punched by CSD personnel and separate programs were needed to effect the changes to the respective records.

Figure 7

Existing System Flow Chart

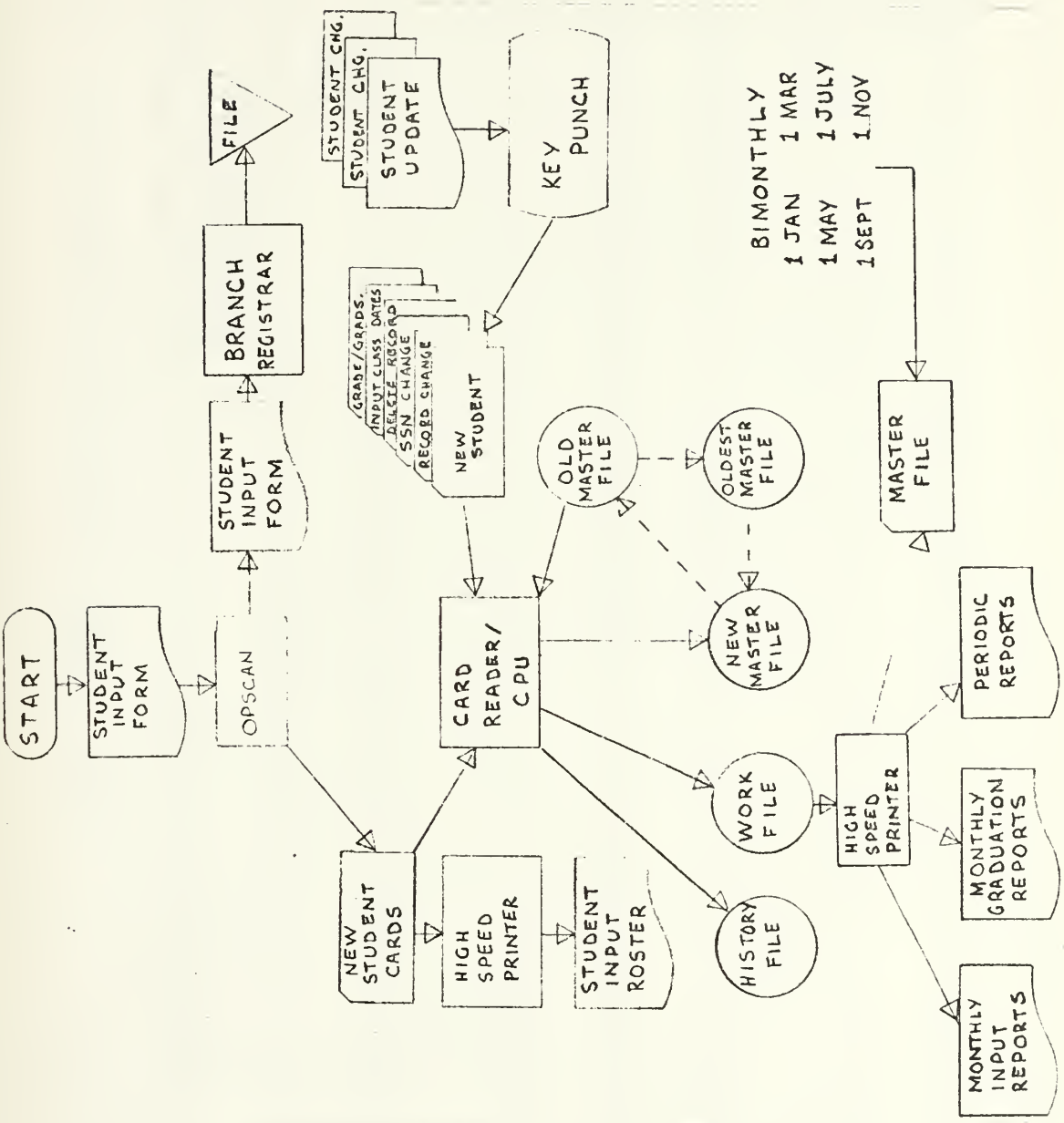


Figure 8

Old Student Master Record Layout

Figure 9

Old Student Registration Form (Form 90)
(Side 1)

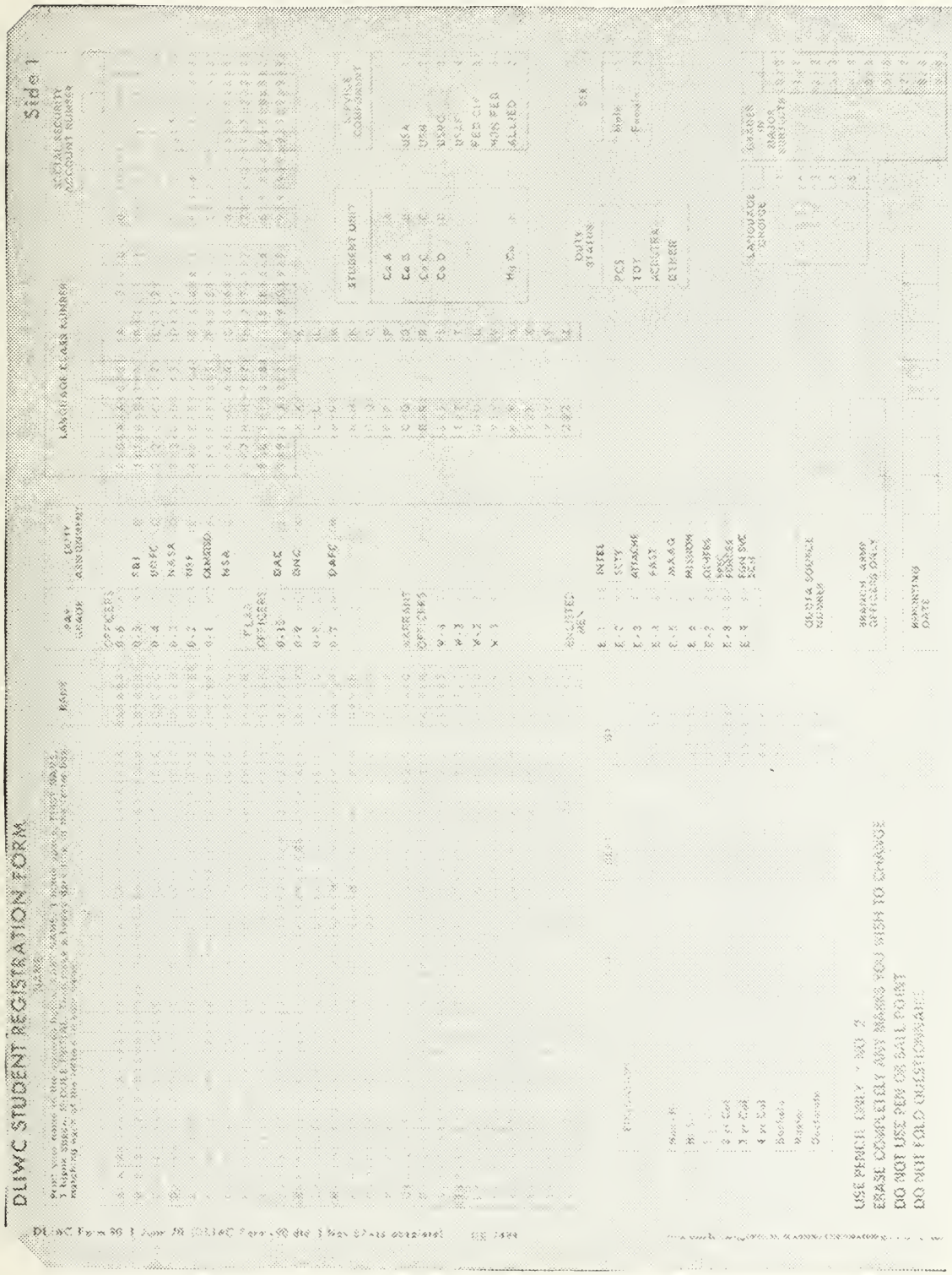


Figure 10

Old Student Registration Form (Form 90)
(Side 2)

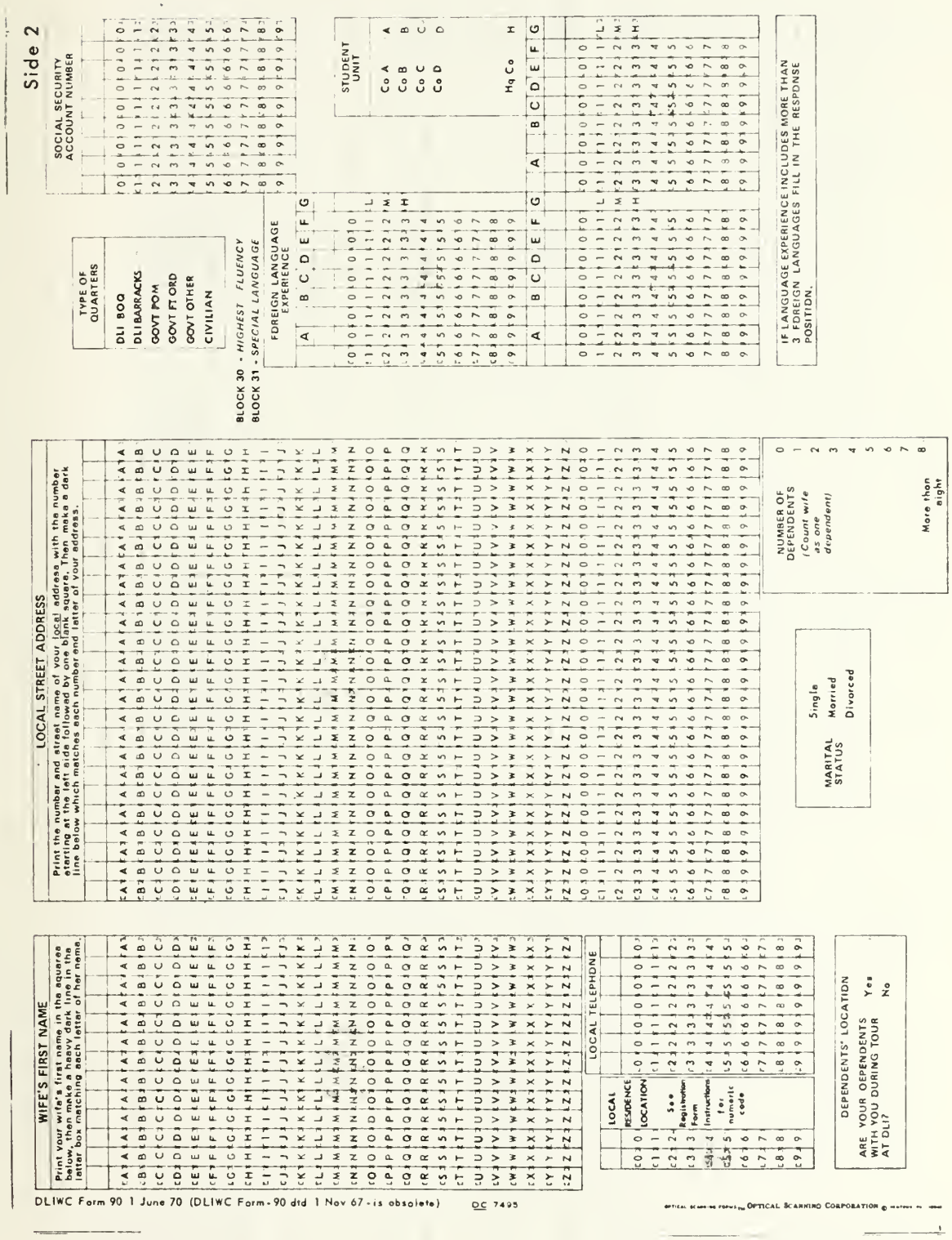


Figure 11

Student Record File Change Input Sheet (DLI Form 11)

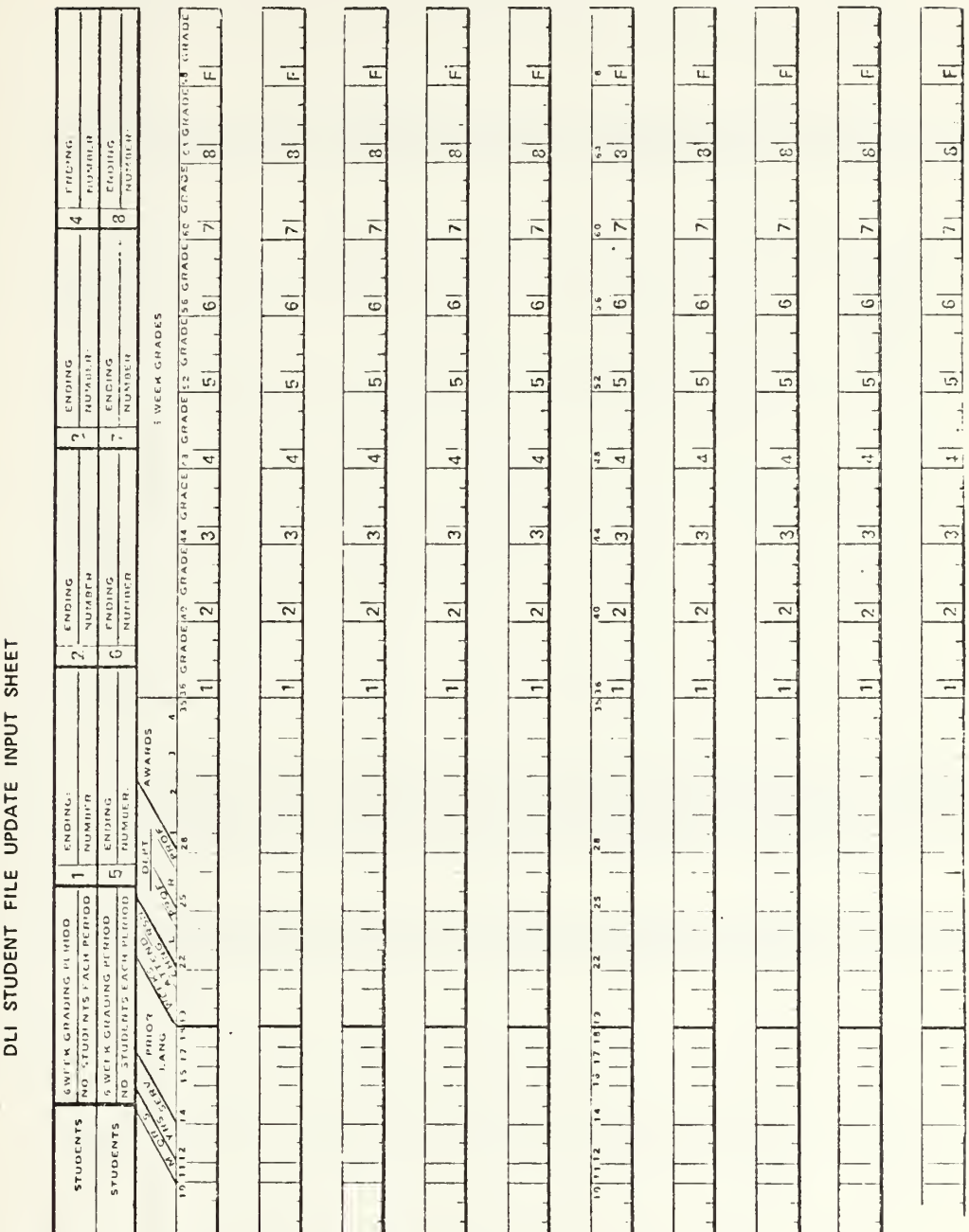


Figure 12

Student Record File Change Input Sheet (DLI Form 35)

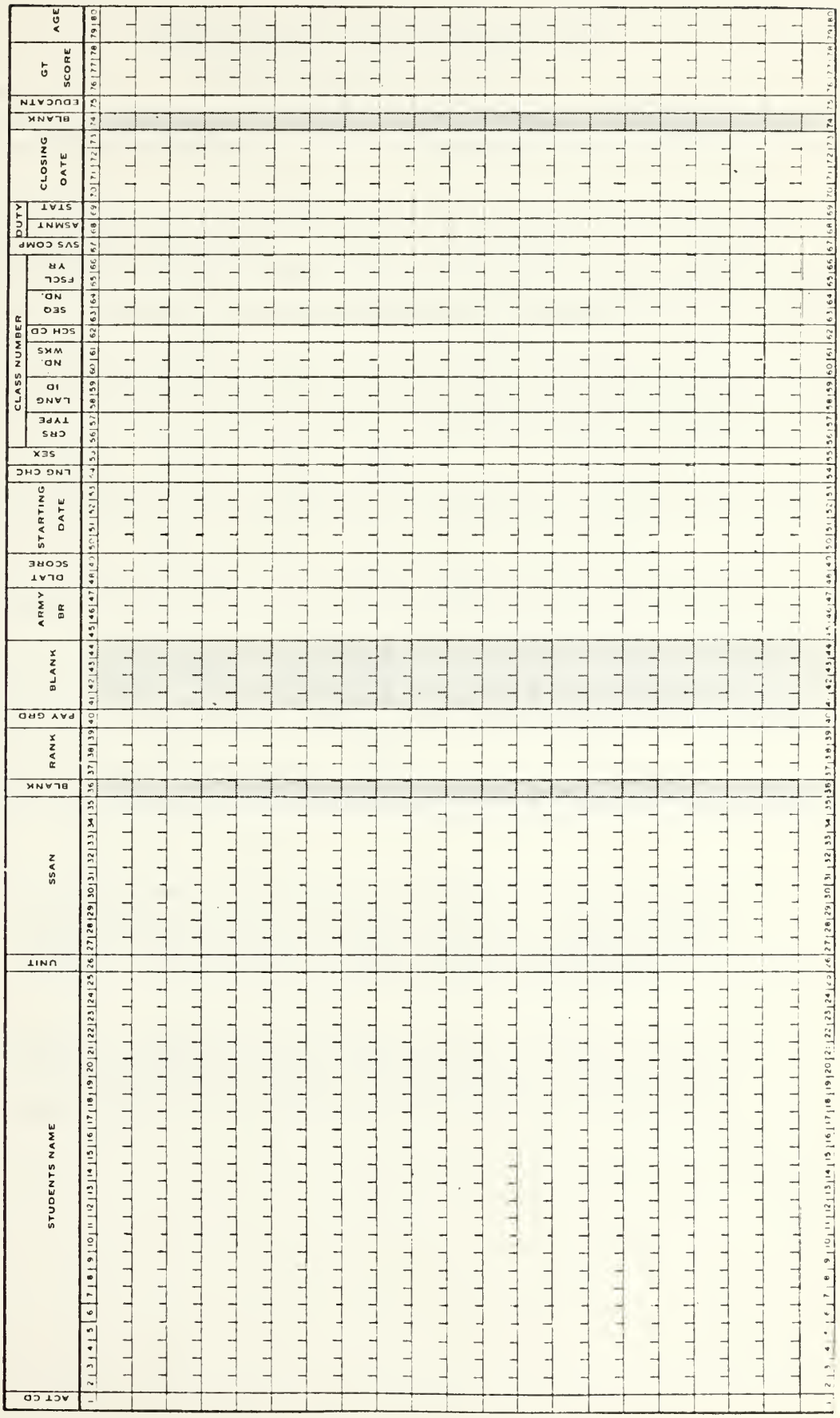


Figure 13

Student Record File Change Sheet,
SSN or Closing Date (DLI form 36)

STUDENT RECORD - FILE CHANGE INPUT SHEET

CHANGE CODES "6" & "7" ONLY

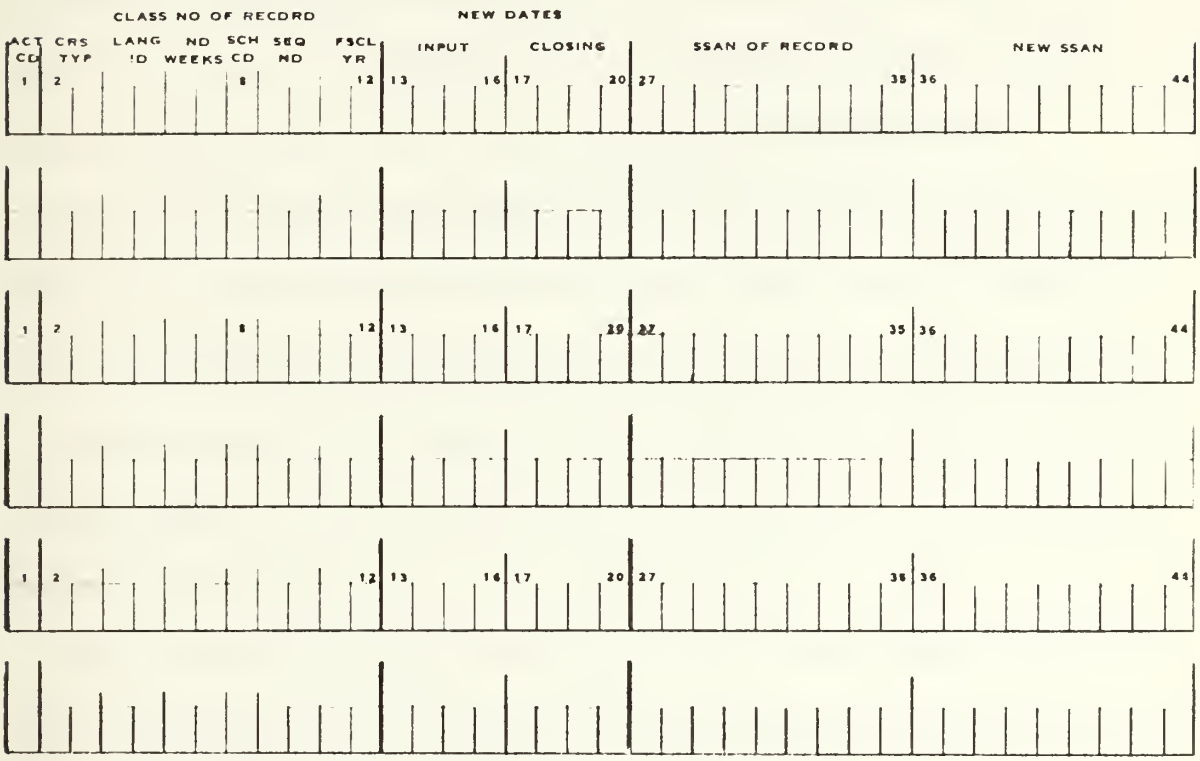
ACTION CODES:

6 - CHANGE SSAN OF RECORD ONLY

7 - CHANGE INPUT AND/OR CLOSING DATES

REPORT TYPE _____

REPORT DATE _____



To change a students SSAN (code 6), enter code "6" in col 1 ("ACT CD" - action code); enter the erroneous SSAN as it appears in the report in the "SSAN OF RECORD" block (cols 27-35); enter the correct SSAN in the "NEW SSAN" block (cols 36-44). When a SSAN change has been made to a record, no other changes are permitted during an update cycle.

To enter or change input/closing dates (code 7), enter code "7" in col 1 (ACT CD - action code); enter the class number to which the changes are to be made in the "CLASS NO OF RECORD" block (cols 2-12); enter the new input and/or closing dates as they should appear in the "NEW DATES" blocks.

APPENDIX B

New System Flow Charts, Record Layouts and Forms

1. New System Flow Chart

The new system eliminates the need for the backup file system used in the old system. By comparing flow charts of both systems it can be seen that there is no need to keep extraneous files of IBM cards.

Most of the changes and updates are effected through on-line terminals without the need for key punching many extra change cards. Interactive queries eliminate the need for many programs needed to generate reports.

All transactions in the upper two-thirds of this flow chart are executed by non-computer personnel allowing the CSD personnel time to organize the remaining system.

Five permanent files are kept in reserve in the event that some unforseen mishap may occur. This allows almost total recovery of all systems within a twenty-four hour period.

The CSD personnel only have access to the actual master file as can be seen in the flow chart, insuring integrity of the data stored.

2. New Student Master Record Layout

The New Student Master Record layout captures much more information than the old system , as the old system allowed 14 characters for expansion. The history file allows CSD personnel to trace a student that has changed curricula or if he has been turned back or forward.

3. New Student Input and Grade Sheets

The New Student Registration forms (figures 14 through 18) capture more information than the old ones, and conform to the Department of Army standards. The new grade sheet frees the professors, as well as some of the CSD personnel from many man-hours of hand compilations.

Figure 14

New Student Registration and Update Flow Chart

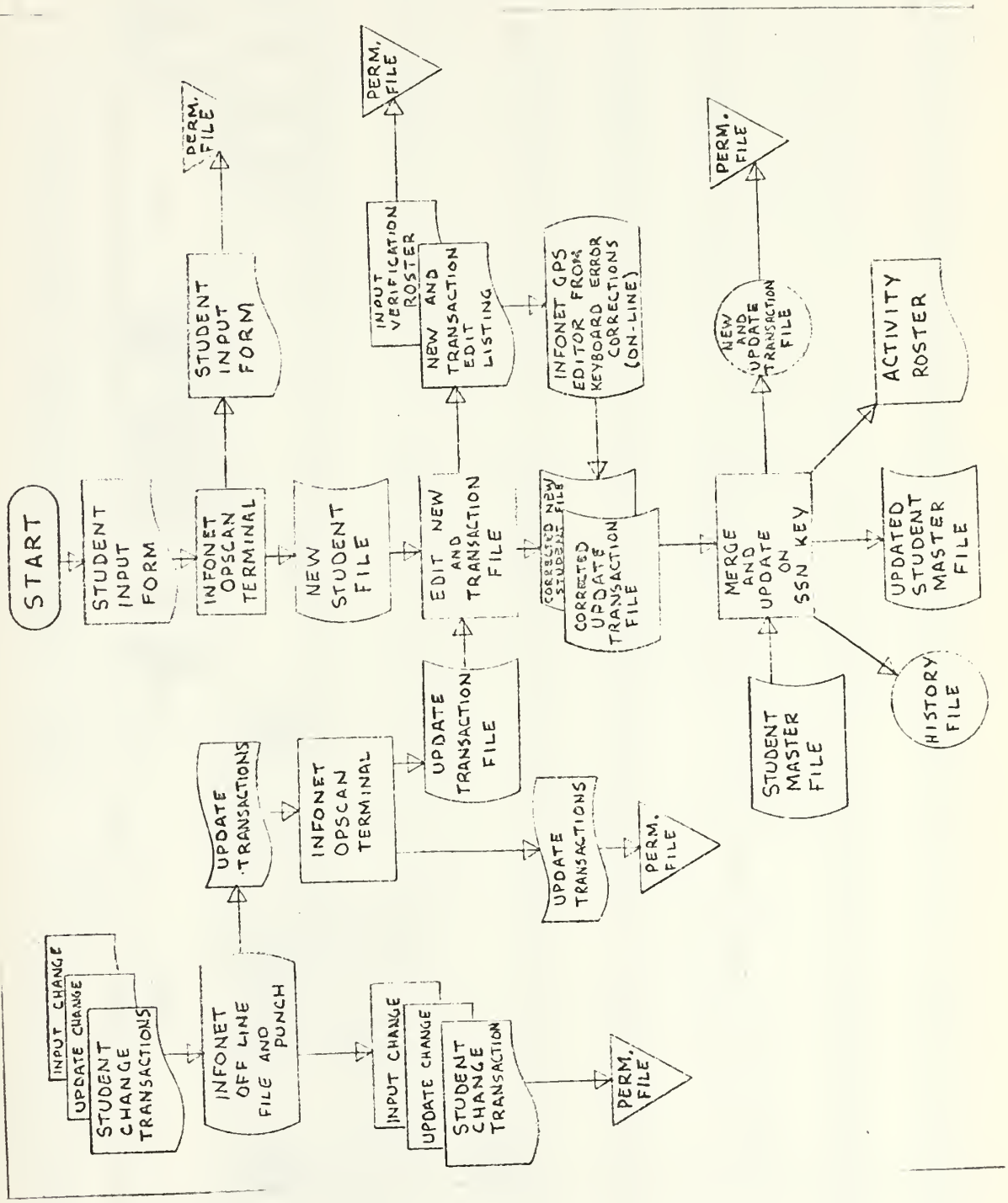


Figure 15

New Student Master Record Layout

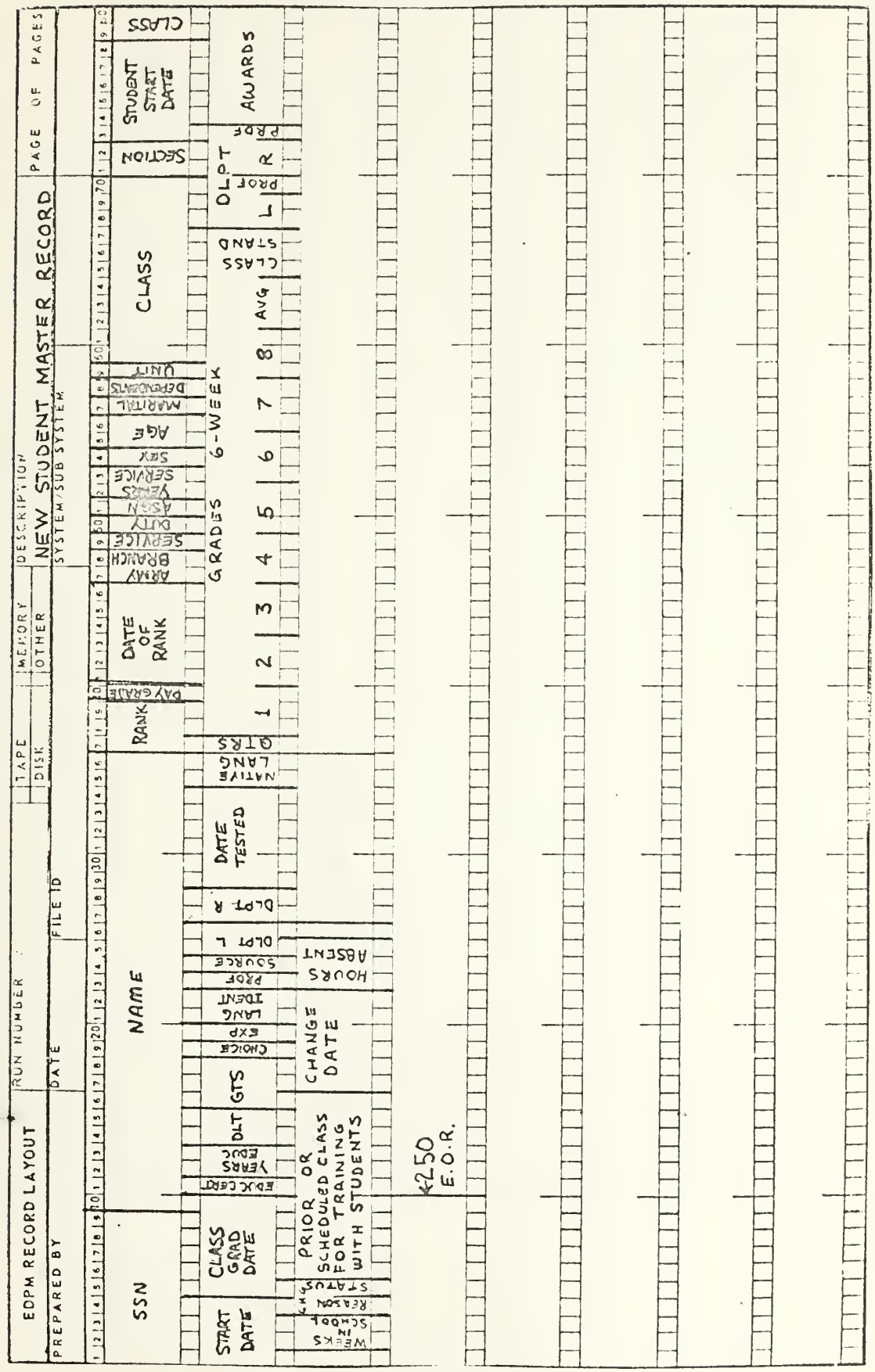


Figure 16

New Student History Record Layout

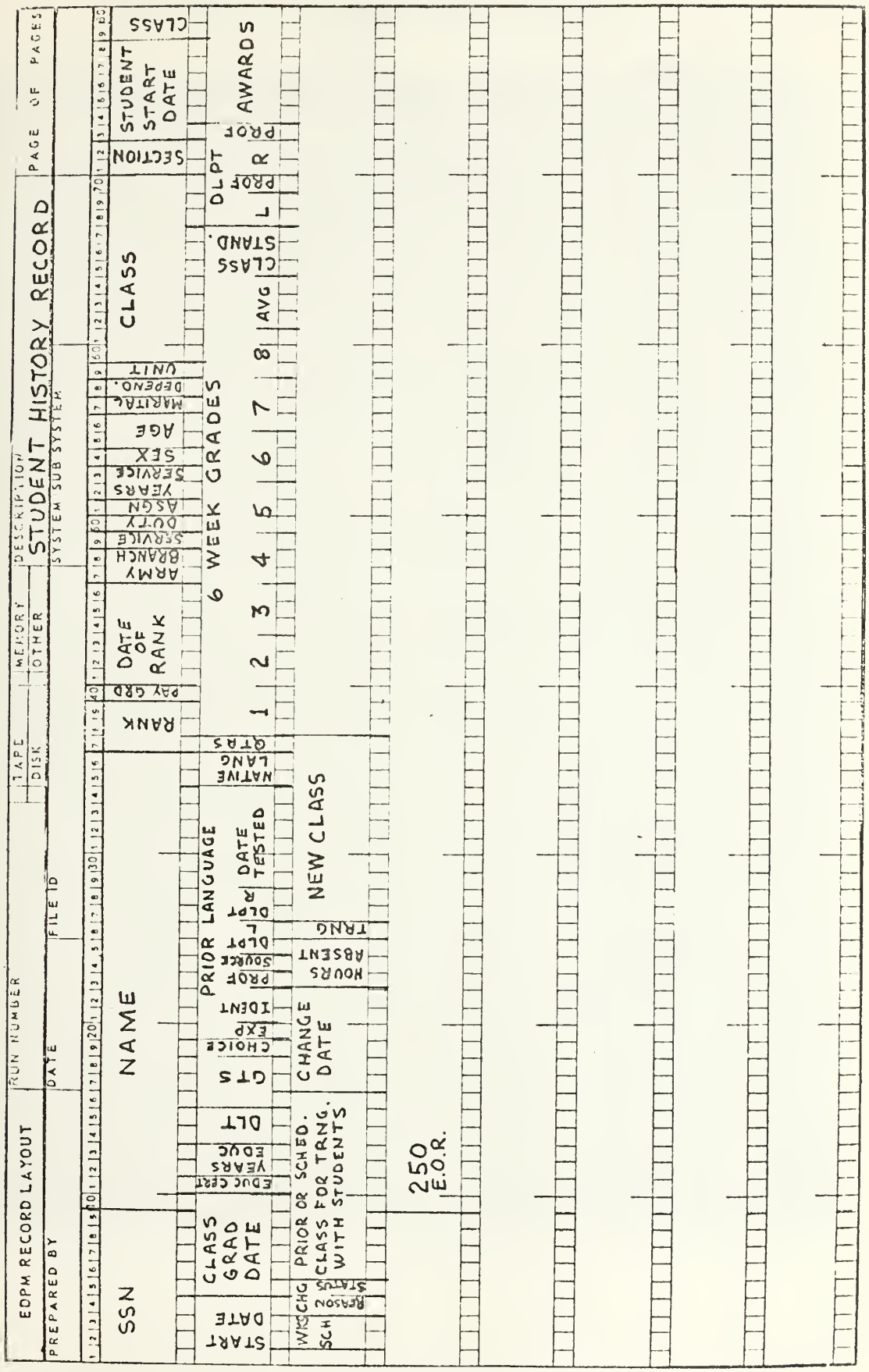


Figure 17

New Student Registration Form (Form 90)
(Side 1)

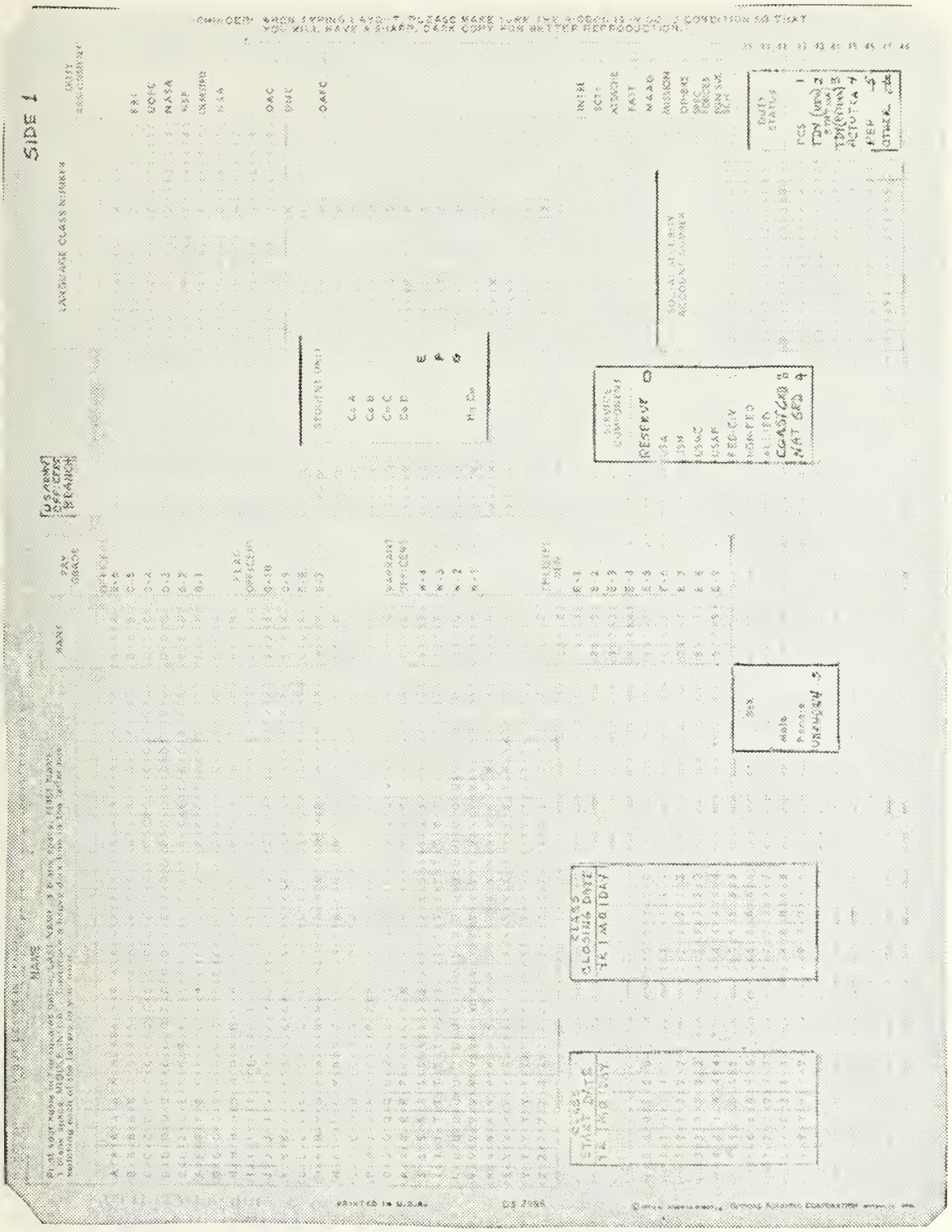


Figure 18

New Student Registration Form (Form 90)
(Side 2)

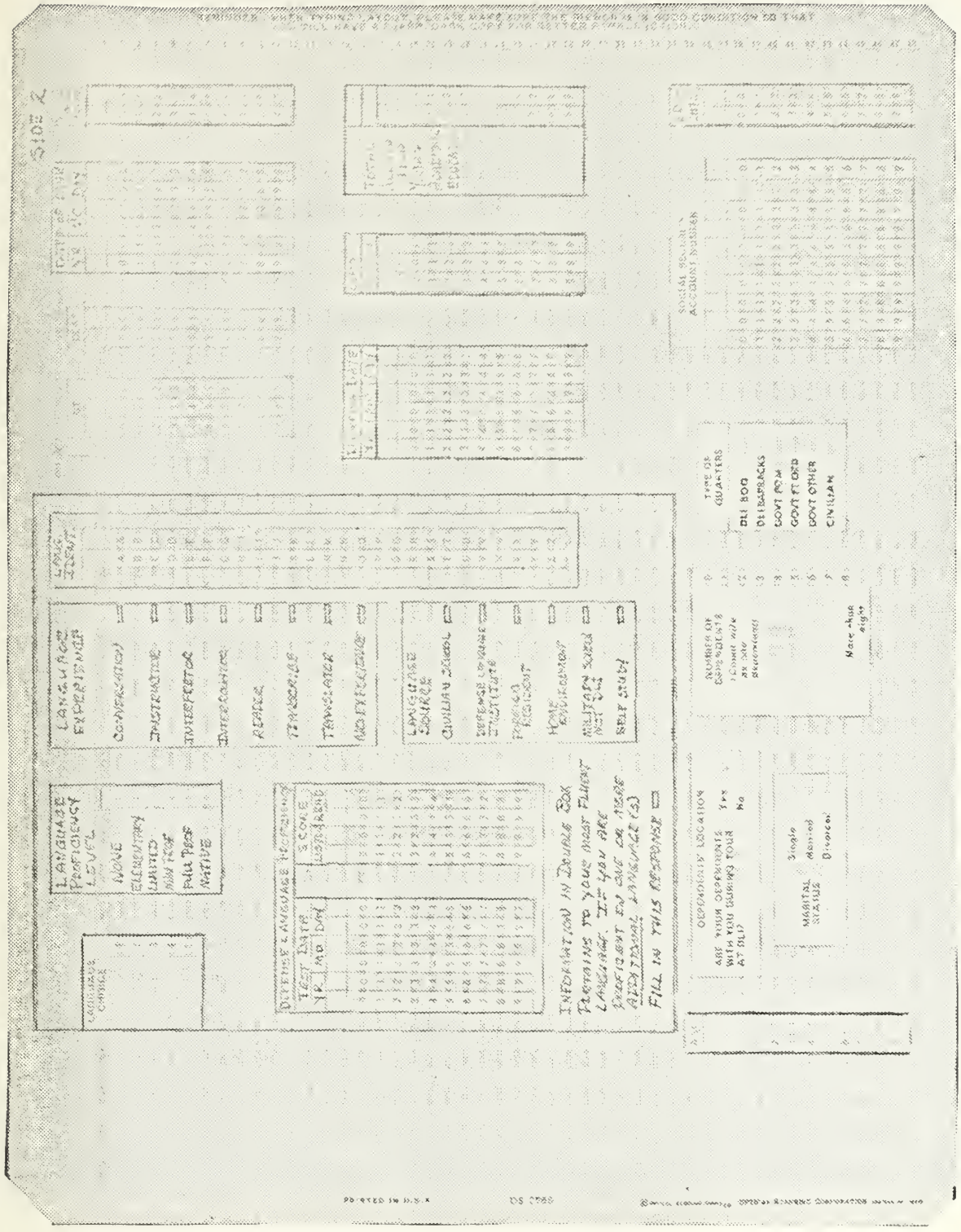
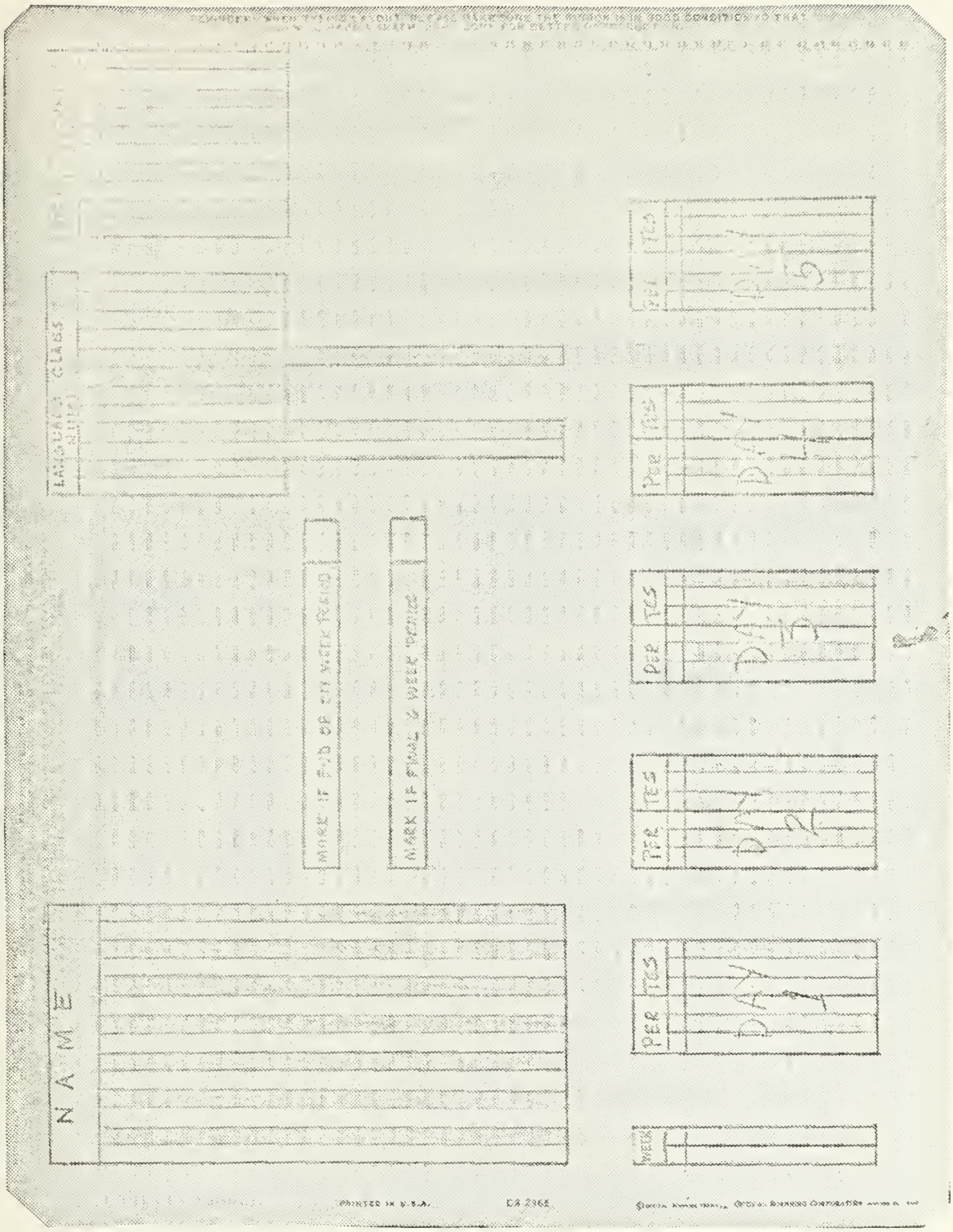


Figure 19

New Student Grade Sheet



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BSTRACT

his thesis presents the development and planning for redesigning the Student ecord System at the Defense Language Institute, West Coast. The redesign s based on the INFONET system of Computer Sciences Corporation and the use f a data Base system and data bease language: Data Management Language DML). This system is in the process of implementation at the Computer Systems ivision of the Defense Language Institute, West Coast, at the present time.

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A redesign of the student record system for the Defense Language Institute, West Coast.